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14. ABSTRACT

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The goal of the proposed work is to rapidly deliver a suite of high interest, high risk advance prototypes at an exceptionally low cost. Over the course of twenty-four months, we will to create up to ten cutting edge education and training applications.

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Introduction

The goal of the proposed work is to rapidly deliver a suite of high interest, high risk advance prototypes at an exceptionally low cost. Over the course of twenty-four months, this work will to create up to ten cutting edge education and training applications fitting the unique needs TARTRC.

Body

One of the unique features of this proposed work is the incorporation of well-tested educational game and traditional video game design principles in producing an engaging, educational experience. During this period the project researched and developed three such experiences (exhibits) named “Cyber People” for the National Museum of Health and Medicine. The applications are an interactive demonstration of vision implants, hearing implants, and neuroprosthetics - not only of the technology but of the challenges and benefits that users experience. Specifically, these experiences are:

A sound experience that emphasizes the progression of cochlear implant technology. A guest observes and listens to a virtual environment. They are able to transition their environment through history as well as the simulated fidelity of a contemporary cochlear implant.

A visual experience that emphasizes the challenges of living with a retinal implant. Guests are immersed in activities such as arranging blocks or opening a lock with a key, while wearing a headset that simulates seeing through an implant. It is up to them to learn to “see” as well as compensate with other senses like touch.

A neuroprosthetic experience that emphasizes the strangeness of learning something familiar in a new way. Using an EEG users first learn to flex a simulated prosthetic leg, ultimately progressing to walking with it.

The experiences:

1. Convey the unusual feeling of having to learn a “new” sense.
2. Show a progression from lack of sense to current prosthetic, and finally to future technology, emphasizing the differences.
3. Draw the attention of museum-goers and impress them with potential of medical technology.

Key Research Accomplishments

Besides a literature search, project members visited the University of Pittsburgh’s Human Engineering Research Laboratories and the VA Hospital in Aspinwall, PA. At the VA hospital a patient with a cochlear implant was interviewed. Outcomes of this research guided the design of the first prototype. The technical design was thoroughly articulated and a flash demo of the “time-traveling” mechanic was produced.

All three experiences were developed in the Unity 3-D game engine. Extensive user testing was performed to refine the experiences.

The deployed games reward creativity explicitly through the game design and scoring systems, but also cultivate users’ natural curiosity through intrinsically motivating experiences.

Reportable Outcomes

More details of the sound experience, including graphics and an interactive video can be seen here: http://www.etc.cmu.edu/projects/tatrc/?page_id=371

More details of the visual experience, including graphics and a video can be seen here: http://www.etc.cmu.edu/projects/tatrc/?page_id=373

More details of the neuroprosthetic experience, including graphics can be seen here: http://www.etc.cmu.edu/projects/tatrc/?page_id=369

The project website can be accessed here: http://www.etc.cmu.edu/projects/tatrc/ The site includes weekly newsletters covering the period, a video describing the project, as well as the detailed descriptions of each experience.

The ETC presented the “Cyber People exhibits at Balticon, May 28, 2012.

Conclusion

Through the development of the first three exhibits, the project has demonstrated the ability to rapidly deliver a suite of high interest, high risk advance prototypes by:

- Identifying the educational/training problem to be solved.
- Specifying the context of use for the game to be developed.
- Appropriately scoping the project.
- Selecting and integrating unique input/output devices